

# Nicotine addiction/Expert

The following article refers to sex/gender differences in nicotine addiction.

## Epidemiology

### Incidence/Prevalence

The prevalence of smoking in Germany is higher among men (31.2 percent) than among women (26.1 percent), whereby a smoker is defined as someone who has smoked a cigarette within the last 30 days and is between 18 and 64 years old. Men also smoke more cigarettes per day: 25.5 percent of male smokers and 16.6 percent of female smokers smoke more than 20 cigarettes per day. Evidence of nicotine dependence (as measured by the Fagerström Test for Nicotine Dependence (FTND)) is present in 10.8 per cent of men and 8.2 per cent of women (see Table 1).[1]

**Table 1. tobacco use among 18- to 64-year-olds: Prevalences [95 % confidence intervals] and extrapolation to the population of Germany. [Source: De Matos et al. (2016).**

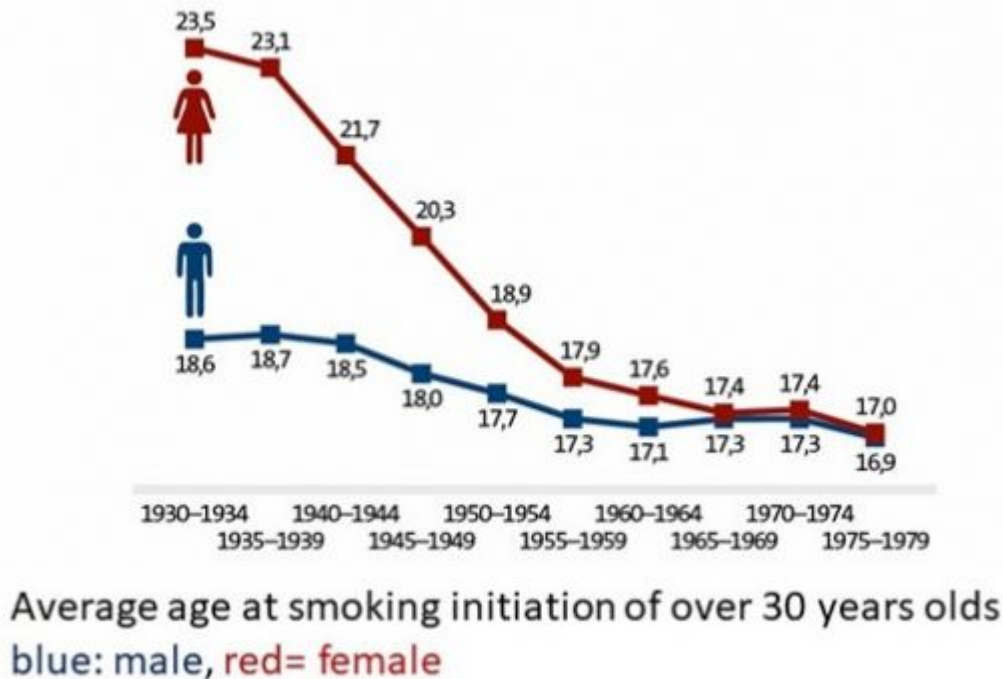
|   | male              | women             | total             | extrapolation |
|---|-------------------|-------------------|-------------------|---------------|
| One-month prevalence of consumption                 | 31.2 [29.2; 33.3] | 26.1 [24.5; 27.7] | 28.7 [27.4; 30.0] | 14.64 Mio.    |
| Heavy consumption (at least 20 cigarettes/day)      | 25.5 [22.2; 29.2] | 16.6 [13.8; 19.8] | 21.4 [18.9; 24.1] | 2.93 Mio.     |
| Clinically relevant consumption (according to FTND) | 10.8 [9.4; 12.3]  | 8.2 [7.1; 9.3]    | 9.5 [8.6; 10.5]   | 4.84 Mio.     |

Daily use tends to increase with age, while dependence is more common in middle cohorts.[2] Overall, about 12 percent of adolescents between the ages of 11 and 17 smoke; in this age group, there does not yet appear to be any sex differences in prevalence. Adolescents are also mostly occasional smokers. Sex differences in prevalence only become apparent in cohorts over 17 years of age, such that males are overrepresented among smokers.[3]

The German Tobacco Atlas 2015 states that the proportion of women smokers only increased significantly towards the middle of the 20th century. Among men, smoking was already widespread several decades earlier. Looking at those over 30 years of age today, the average age of initiation decreases more and more across the birth cohorts, significantly more so for women than for men, and increasingly equalises in the gender comparison (compare chart 1).[4]

## Risk and protective factors

## Pathophysiology



Graph 1. average age at smoking initiation (women and men). [Source: Tobacco Atlas 2015, Pötschke-Langer et al. (2015), p. 37].

For several years, the prevalences of smoking in Germany have been decreasing in all age groups. The trend towards non-smoking can be observed most clearly among children and adolescents. At the end of the 1990s, almost 30 percent of 12- to 17-year-olds smoked; currently it is only about 10 percent. The changes in prevalences over different survey years, subdivided according to age group and gender, can be seen in chart 2.[5]

Smoking behaviour depends on social status, which is determined by educational level, occupational position and income situation. For several decades, more men and women of low social status smoke than those of high social status. For men, this social difference in smoking behaviour can be observed across all age groups, for women only in middle age (between 30 and 64 years of age).

### Pathophysiology

Numerous differences are found between men and women with regard to nicotine metabolism:[7] The liver enzyme CYP2A6, which is responsible for the degradation of nicotine to cotinine, shows a higher activity in women, which is why nicotine can be metabolised faster in women overall. [8] The activity of CYP2A6 is presumably influenced by female hormones (especially oestradiol), as the use

of oral contraceptives or the presence of pregnancy increase nicotine metabolism, while there are no sex differences in activity between men and women who are going through or have gone through menopause.[9] However, in the period between the follicular and luteal phases in women, there are no sex differences in nicotine metabolism.[10] The activity of CYP2A6 is also influenced by the presence of oestradiol.

Triggers of nicotine craving may also differ between the sexes: Reasons for smoking are often positive reinforcement effects in men, while emotion regulation (smoking as a coping strategy) and reactivity to cue stimuli are more often triggers for craving in women.[11]

There is evidence that women are more susceptible to the harmful effects of tobacco.[12] Female smokers have an increased risk of coronary heart disease and of heart attacks. Smoking is a risk factor for stroke for both sexes to the same extent. The likelihood of lung disease is higher in women who smoke, but also decreases more rapidly in women than in men after they stop smoking. Problems specific to women include a premature menopause, heavier menstrual bleeding, and an increased risk of spontaneous miscarriage and difficulty getting pregnant.[13]

Nicotine use during pregnancy can also have serious consequences for the unborn child. Often the birth weight as well as the birth size is reduced. For example, children born to smokers weigh on average 200 to 300 grams less, are smaller and have a smaller head circumference than children born to non-smokers. In addition, the child's risk of reduced lung function, malformations such as cleft palate and behavioural and concentration disorders (e.g. ADHD) increases. Smoking during pregnancy also increases the risk of sudden infant death[14].

## Clinical presentation

### Symptoms

In general, the following applies to substance-related disorders: Due to the telescoping effect (accelerated progression of dependence in women), women who seek treatment often show greater dependence as well as a higher prevalence of comorbid mental disorders.[15] Both craving and withdrawal symptoms are more pronounced in women. Behavioural analogies are also evident in animal studies with female and male rodents.[16] Even the motivation to start treatment can differ between the sexes. T

### Diagnostics

# Patient management

## Therapy

## Physician-patient interaction

In general, the advice of the doctor (e.g. in the form of a brief intervention) is an important predictor of smoking cessation in men and women [18] Brief interventions should therefore definitely be used more in practice.

## Treatment outcome

### *Nicotine replacement therapy*

Men seem to benefit more than women from nicotine patches or nicotine gum. Regarding treatment with nicotine patches, it was found that more women than men discontinue them because of skin irritation.[19] Overall, however, the evidence is inconclusive.

### *Fluoxetine*

According to one study, sequential fluoxetine eight weeks before smoking cessation reduces depressive symptoms, withdrawal-related negative affect and craving only in women.[20] For women, pre-smoking depressive symptoms and craving were related to abstinence duration, while for men, withdrawal-related negative affect was related to abstinence duration. In contrast, according to the S3 guideline, no evidence of efficacy can be found for fluoxetine.[21]

### *Bupropion*

Bupropion appears to be more effective in maintaining abstinence from smoking in women, possibly related to its ability to reduce weight gain during smoking cessation.[22]

### *The female menstrual cycle*

The female cycle influences the subjective effects of drugs as well as physiological responses and withdrawal symptoms.[22] In smoking subjects in particular, attempts have been made to harness the inhibitory effects of progesterone by initiating smoking cessation during the luteal phase (when progesterone levels are highest). However, the evidence is mixed: Some studies have reported success in terms of longer time to relapse, but others have found no effects of the cycle phase on treatment success, or withdrawal symptoms were even lower in the follicular phase.[22]

Psychosocial factors

Prevention

Translation into patient care

Open research questions

Outlook

External Links

Literature

1. Elena Gomes de Matos, Josefine Atzendorf, Ludwig Kraus und Daniela Piontek (2016) Substanzkonsum in der Allgemeinbevölkerung in Deutschland. Ergebnisse des Epidemiologischen Suchtsurveys 2015. SUCHT (2016), 62 (5), 271–281, <http://www.esa-survey.de/> DOI 10.1024/0939-5911/a000445.
2. Pabst, A., Kraus, L., De Matos, E. G., & Piontek, D. (2013). Substanzkonsum und substanzbezogene Störungen in Deutschland im Jahr 2012. Sucht, 59(6), 321–331.
3. Pötschke-Langer, M., Kahnert, S., Schaller, K., Verena, V., Heidt, C., Schunk, S., ... Fode, K. (2015). Tabakatlas (1st ed.). Heidelberg: Deutsches Krebsforschungszentrum.
4. Pötschke-Langer M, Kahnert S, Schaller K, Viarisio V: Tabakatlas 2015. Deutsches Krebsforschungszentrum in der Helmholtz-Gemeinschaft (dkfz). Im Zusammenarbeit mit: Robert-Koch-Institut, Universität Hohenheim, Institut für Therapieforchung (IFT). Gefördert von: Bundesministerium für Gesundheit.

5. Pötschke-Langer M, Kahnert S, Schaller K, Viarisio V: Tabakatlas 2015. Deutsches Krebsforschungszentrum in der Helmholtz-Gemeinschaft (dkfz). Im Zusammenarbeit mit: Robert-Koch-Institut, Universität Hohenheim, Institut für Therapieforchung (IFT). Gefördert von: Bundesministerium für Gesundheit.
6. Missing text
7. Agabio, R., Pani, P. P., Preti, A., Gessa, G. L., & Franconi, F. (2016). Efficacy of Medications Approved for the Treatment of Alcohol Dependence and Alcohol Withdrawal Syndrome in Female Patients: A Descriptive Review. *European Addiction Research*, 22(1), 1-16.
8. Franconi, F., Campesi, I., Occhioni, S., Antonini, P., & Murphy, M. F. (2013). Sex and Gender in Adverse Drug Events, Addiction, and Placebo. In *Handbook of experimental pharmacology* (pp.107-126).
9. Agabio, R., Campesi, I., Pisanu, C., Gessa, G. L., & Franconi, F. (2016). Sex differences in substance use disorders: focus on side effects. *Addiction Biology*, 21(5), 1030-1042.
10. Hukkanen, J., Gourlay, S. G., Kenkare, S., & Benowitz, N. L. (2005). Influence of menstrual cycle on cytochrome P450 2A6 activity and cardiovascular effects of nicotine\*. *Clinical Pharmacology & Therapeutics*, 77(3), 159-169.
11. Agabio, R., Campesi, I., Pisanu, C., Gessa, G. L., & Franconi, F. (2016). Sex differences in substance use disorders: focus on side effects. *Addiction Biology*, 21(5), 1030-1042.
12. Agabio, R., Campesi, I., Pisanu, C., Gessa, G. L., & Franconi, F. (2016). Sex differences in substance use disorders: focus on side effects. *Addiction Biology*, 21(5), 1030-1042.
- Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance Abuse in Women. *Psychiatric Clinics of North America*, 33(2), 339-355.
13. Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance Abuse in Women. *Psychiatric Clinics of North America*, 33(2), 339-355.
14. Pötschke-Langer, M., Kahnert, S., Schaller, K., Verena, V., Heidt, C., Schunk, S., ... Fode, K. (2015). *Tabakatlas* (1st ed.). Heidelberg: Deutsches Krebsforschungszentrum.
15. Bobzean, S. A. M., DeNobrega, A. K., & Perrotti, L. I. (2014). Sex differences in the neurobiology of drug addiction. *Experimental Neurology*, 259, 64-74.
16. Becker, J. B., McClellan, M., & Reed, B. G. (2016). Sociocultural context for sex differences in addiction. *Addiction Biology*, 21(5), 1052-1059.
17. Pötschke-Langer M, Kahnert S, Schaller K, Viarisio V: Tabakatlas 2015. Deutsches Krebsforschungszentrum in der Helmholtz-Gemeinschaft (dkfz). Im Zusammenarbeit mit: Robert-Koch-Institut, Universität Hohenheim, Institut für Therapieforchung (IFT). Gefördert von: Bundesministerium für Gesundheit.
18. Pötschke-Langer, M., Kahnert, S., Schaller, K., Verena, V., Heidt, C., Schunk, S., ... Fode, K. (2015). *Tabakatlas* (1st ed.). Heidelberg: Deutsches Krebsforschungszentrum.
19. Agabio, R., Campesi, I., Pisanu, C., Gessa, G. L., & Franconi, F. (2016). Sex differences in substance use disorders: focus on side effects. *Addiction Biology*, 21(5), 1030-1042.
20. Minami, H., Kahler, C. W., Bloom, E. L., Prince, M. A., Abrantes, A. M., Strong, D. R., ... Brown, R. A. (2014). Effects of sequential fluoxetine and gender on prequit depressive symptoms, affect, craving, and quit day abstinence in smokers with elevated depressive symptoms: A growth curve modeling approach. *Experimental and Clinical Psychopharmacology*, 22(5), 392-406.
21. S3-Leitlinie "Screening, Diagnostik und Behandlung des schädlichen und abhängigen Tabakkonsums" AWMF-Register Nr. 076-006

22. Agabio, R., Campesi, I., Pisanu, C., Gessa, G. L., & Franconi, F. (2016). Sex differences in substance use disorders: focus on side effects. *Addiction Biology*, 21(5), 1030-1042

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